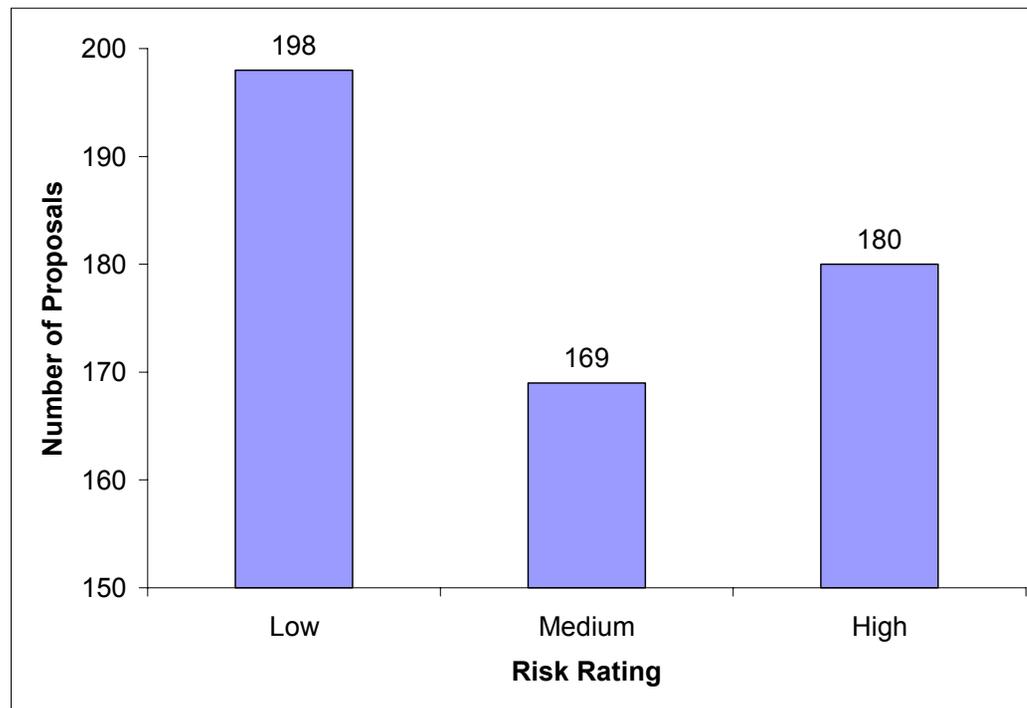


Some Lessons Learned



Lessons Learned Summary from TMC Reviews

- Study based on ten years of NASA directed TMC evaluation of PI-Led Science Mission proposals.
- No full missions rated as High Risk by TMC have been selected for implementation.

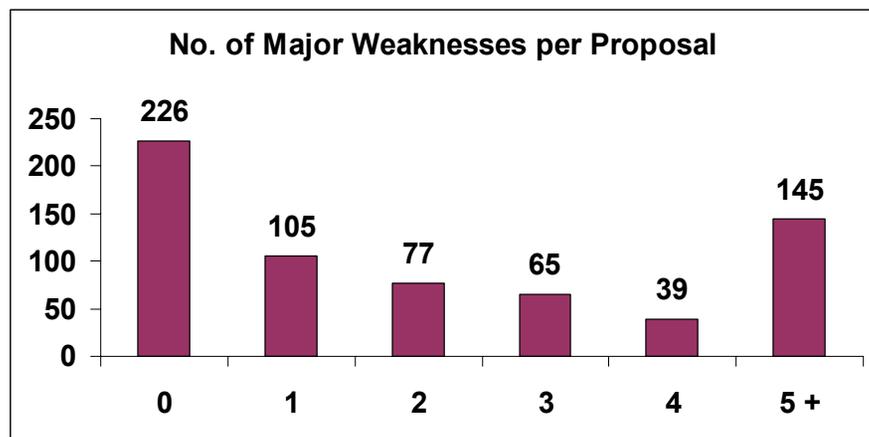


Summary of Risk Ratings for Step 1 Proposals

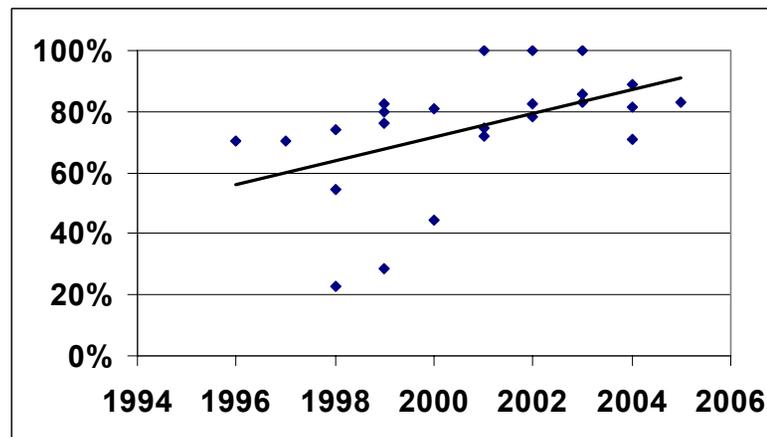


Lessons Learned Summary from TMC Reviews (cont'd)

- Only 34% of proposals reviewed were judged to have no major weaknesses
- Number and severity of major weaknesses directly affect the overall implementation risk rating.
- Trend in percentage of proposals with one or more major weaknesses is increasing



History of Major Weaknesses per Proposal Evaluated



Percentage of Proposals with one or more Major Weakness



Lessons Learned Summary from TMC Reviews (cont'd)

Common Causes of Major Weaknesses:

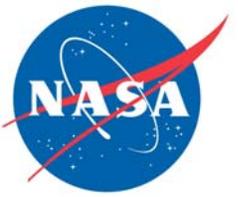
- Technical Design Margins (Mass, Power, etc.)
 - Insufficient data provided from which to independently verify the margins.
 - No margin provided or conflicting data provided.
 - Margin provided deemed too low based on the maturity of the design.
- Cost
 - Concerns relating to cost reserve (Below AO requirement, too low based on liens/threats, phasing inconsistent with anticipated needs).
 - Unable to validate proposed cost
- Instrument Implementation
 - Heritage claims not substantiated/development risks not adequately addressed.
 - Inadequate/inconsistent description and detail.
 - Inconsistencies between instrument requirements and bus capabilities.
- Complex Operations
 - More common in payloads containing multiple instrument that required tight scheduling/sequential operations.
 - Inadequately addressing the challenges inherent in lander operations.



Lessons Learned Summary from TMC Reviews (cont'd)

Common Causes of Major Weaknesses (cont'd):

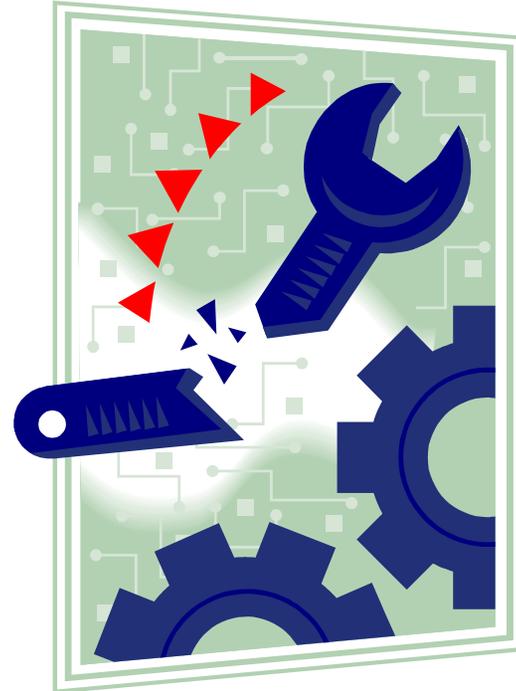
- Systems Engineering
 - Incomplete flow-down of science requirements to payload/flight system accommodations.
 - Incomplete description of how the systems engineering function will be executed.
 - Inadequate resources allocated to accomplish this function.
- Management Plans
 - Confusing/conflicting organizational roles and responsibilities.
 - Lack of demonstrated organizational/individual expertise for specified role.
 - Insufficient time commitments for key personnel.
- Schedules
 - Insufficient detail from which to perform an independent assessment.
 - Inadequate/no schedule reserve identified.
 - Overly ambitious schedules that are not consistent with recent experiences.



Areas to Watch from D&NF Program Office Experience



- **Software**
 - Test beds
 - Fault Protection/Autonomy
- **Integrated Project Schedule**
- **Heritage Hardware**
- **Workforce roll off for launch**
 - Optimistic Test Schedules
 - Verification and Validation
- **Vendor Assumptions**
 - Experience
 - Insight/Oversight requirements



Lessons Learned from a Cost Perspective: First Step for a Prospective PI

READ THE NRA/AO/RFP, COVER TO COVER!!!

Read the Technical, Management, Cost, Education & Public Outreach, and Proposal Submittal sections with as much attention to detail as you place on the Science Section

The biggest risk to the PI at this stage is that the proposal will not be selected. Some suggestions to prevent rejection:

- Provide ALL requested data
 - Look for “show”, “list”, “provide”, “explain”, “describe”, etc.
 - Make liberal use of a highlighter
 - Create a compliance matrix, include it with the proposal
- Get a good Project Manager and Systems Engineer right away - they’re experts in what needs to be done
- Pay attention to proposal submittal instructions

IIP NRA Example:

- E. Research Management Plan – Provide a statement-of-work that concisely describes each task or milestone to be accomplished in the course of the research and development. Also, include a milestone chart that identifies critical dates in the research and development program. At least two milestones per 12 month period should be defined; the first midway and the second near the end of the period. Identify the roles of key personnel.
- F. Budget – Full cost accounting (FCA) is required in all proposals, including those submitted by U.S. Government agencies. To assist in the selection process, Government proposals should be submitted with budgets that clearly indicate the costs with and without FCA. Budget data entered on the Proposal Cover sheet must be in FCA; Government proposals should clearly indicate non-FCA budgets in the text of the proposal. Cost sharing or matching arrangements should also be indicated, if applicable. Appendix D describes the requested budget summary format. In addition, a monthly cost plan should be submitted to

IIP Proposals:

16 of 64 did not provide SOW

9 of 64 did not provide milestone charts

5 of 64 did not provide full-cost accounting for government work

36 of 64 did not provide a monthly cost plan

